

November 7, 2019

**VIA ELECTRONIC FILING**

Marlene H. Dortch, Secretary  
Federal Communications Commission  
445 Twelfth Street, S.W.  
Washington, DC 20554

**Re: WT Docket No. 19-38  
*Ex Parte* Presentation**

Dear Ms. Dortch:

The Industrial Internet of Things (“IIoT”) Coalition files this *Ex Parte* communication in support of the Federal Communications Commission’s (“FCC” or “Commission”) initiation of the instant proceeding<sup>1</sup> in response to the Mobile Now Act.<sup>2</sup> The IIoT Coalition is a group of industrial entities that rely on wireless communications to conduct their operations efficiently and safely or are organizations that represent such entities. They include electric and gas utilities whose services are fundamental to the day-to-day activities of all Americans, as well as entities that operate components of the transportation nervous system through which American commerce runs such as pipelines, trucking, freight rail, airports, overnight delivery services, and ports. Manufacturers of virtually all products produced in this country are represented, as are farming operations and medical facilities. Collectively, these parties are the heart of the American economy with an increasing reliance on IIoT applications.

The companies represented in the IIoT Coalition utilize a variety of wireless systems to meet their increasingly complex communications requirements. Most use commercial wireless networks for certain applications, but the majority also require private wireless facilities. In some instances, their industrial operations are situated in remote areas well beyond the coverage of commercial providers. In other cases, the industrial entities must meet specific reliability, resiliency, security and/or functional criteria that are not satisfied on commercial networks.<sup>3</sup> Those requirements demand deployment of systems that are designed, constructed, and operated by the industrial entities themselves, giving them control over their facilities, including the ability to isolate them from the Internet and its associated security issues.

Just as these companies utilize both commercial and private systems, many also use licensed and unlicensed spectrum. Unlicensed spectrum has a place in their communications portfolios as it is useful for certain applications, but given the core responsibilities of these companies, the majority of which are classified as “Critical Infrastructure” by the Department of Homeland Security,<sup>4</sup> their operations cannot be conducted on unlicensed spectrum that does not

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<sup>1</sup> *Partitioning, Disaggregation, and Leasing of Spectrum*, Notice of Proposed Rulemaking, WT Docket No. 19-38, 34 FCC Rcd 1758 (2019) (“NPRM”).

<sup>2</sup> Making Opportunities for Broadband Investment and Limiting Excessive and Needless Obstacles to Wireless Act (“MOBILE NOW”), Pub. L. No. 115-141, Division P, Title VI, § 601 *et seq.* (2018) (“Act”).

<sup>3</sup> Many of the companies represented in the IIoT Coalition operate in areas where commercial wireless service may be inadequate or non-existent.

<sup>4</sup> <https://www.dhs.gov/cisa/critical-infrastructure-sectors>.

ensure appropriate levels of security and reliability. However, it is challenging to acquire the licensed spectrum needed for private wireless networks on which advanced IIoT capabilities can be deployed, particularly wireless broadband spectrum capable of supporting the innovative wireless technologies and connectivity solutions that American industry needs to maintain its global preeminence.

For this reason, the IIoT Coalition welcomes the initiation of this proceeding by the Commission in response to the MOBILE NOW Act. Congress has directed the Commission to investigate whether it could promote more intensive utilization of licensed, geographic spectrum through leasing and partitioning/disaggregation rules or policies that would make unused spectrum available to unaffiliated small carriers and carriers serving rural communities. The IIoT Coalition supports this initiative, although it also emphasizes that secondary market transaction are supplemental to and not a sufficient substitute for dedicated licensed spectrum. This Congressional objective would be further enhanced by applying the rules adopted in this proceeding to classes of licensees beyond those required by the MOBILE NOW Act as suggested by the FCC.<sup>5</sup> In particular, the FCC should extend these rules to entities such as IIoT Coalition members that will use the spectrum to deploy private wireless systems as recommended by the American Petroleum Institute (“API”).<sup>6</sup>

The Act requires the FCC to consider four questions in this rulemaking proceeding. First, the Commission must determine whether reducing the performance requirements for entities that acquire spectrum through leasing/partitioning/disaggregation would facilitate deployment of advanced technologies in the covered areas. Second, it must consider what conditions will be needed to ensure that spectrum is deployed in a reasonable period of time. Third, the Commission is directed to consider incentives for making spectrum available through these means, including by extending license terms or modifying performance requirements for the leased or assigned spectrum. Finally, the Commission must evaluate the administrative feasibility of these or other incentives.

The Act presents these questions in the context of making spectrum available for small and rural carrier operations. However, the overriding objective – promoting the more intensive utilization of spectrum for which a licensee has no foreseeably anticipated demand – should apply equally to facilitating its use by the nation’s industrial entities, the engine that is foundational to and drives the economic life of the country.

Attachment A describes the myriad advanced technology use cases for which IIoT Coalition members require broadband spectrum that could be leased or acquired under the programs that are adopted in this proceeding. It also details the challenges they have faced in accessing the necessary spectrum under the current rules. These entities recognize that all spectrum leases or sales must involve a mutually satisfactory economic component. Licensees that have acquired spectrum from the FCC or in the secondary market must be motivated, not mandated, to enter into spectrum transactions that are consistent with their own economic interests and those of the acquiring party. The IIoT Coalition believes that the following rule or policy changes would act as incentives for voluntary transactions that could promote greater use of leasing/partitioning/ disaggregation opportunities.

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<sup>5</sup> NPRM at ¶ 20.

<sup>6</sup> See API Comments filed June 3, 2019.

**1) Allow build-out extensions of up to two years if the lease or sale agreement is reached within 12 months of the licensee's build-out deadline.**

The Commission's build-out requirements have a single objective: ensure that spectrum resources are placed into use within a reasonable time or are returned to the FCC until reauctioned or otherwise made available to a new licensee. Commercial service providers typically do not need further incentives to deploy network facilities in areas where population density drives financially-based metrics to satisfactory economic returns. These metrics are challenged in areas lacking favorable population densities.

Members of the IIoT Coalition and other industrial entities value spectrum based on a different metric. They do not provide a for-profit communications service to the public, but utilize spectrum to address internal operating requirements such as those described in the use cases in Attachment A. Their needs are independent of population density and sometimes are in areas where commercial wireless network deployments are uneconomic. Instead, the value is based on deploying and operating reliable, secure, and robust connectivity on a geographically defined basis to manage and monitor critical industrial infrastructure and other industrial operations responsible for sustaining U.S. economic activity.

If a commercial operator determines within 12 months of its build-out deadline that deployment of additional network facilities is needed in an area where it has no incentive to build, allowing it to lease or assign to a private enterprise entity in conjunction with a deadline extension would be a sound public policy outcome. It would provide an incentive for a transaction that would put spectrum into highly productive use in an otherwise undeployed area in a reasonable amount of time. The alternative, having the FCC recover the spectrum, promotes inefficiency. It too frequently results in spectrum remaining in the Commission's inventory for very extended periods while waiting in queue behind other auctions or alternative means of reassigning recovered spectrum.

**2) Adopt flexible performance requirements for private internal systems whose coverage and operating requirements are defined by the parameters of the facilities they need to cover (e.g., factories, refineries, airports, pipelines, and ports), building on the FCC's description of "substantial service" as one that addresses a unique, niche market.**

Attachment A describes the challenges faced by industrial users when trying to acquire spectrum in the auction process. Their coverage requirements rarely conform to the relatively large licensing areas sold in auctions. Even counties, the smallest geographic component used by the FCC, often encompass more geography than needed for private wireless users. It is not economically practical for these licensees to compete in the auction process against entities whose business models are based on providing service to as great a percentage of population as possible within a wide geographic area, a model that mirrors the FCC's build-out criteria. Conversely,

industrial users' wireless coverage and service objectives are typically operation area-specific, defined by the need to manage and monitor industrial infrastructure and field-based assets.

This same issue arises in the secondary market when an industrial entity seeks to purchase spectrum from a successful auction participant. Whether the industrial user must independently meet the build-out requirement for the geographic area it wishes to acquire, or the carrier intends to rely on that entity's deployment to help satisfy the build-out requirement for the entire auction area, performance criteria tailored to private industrial users' internal requirements will provide an incentive for these voluntary transactions. The result will be deployment of advanced technologies on spectrum that otherwise might remain unused for an extended period, either by the carrier or by being held in Commission inventory. The FCC can promote that outcome by adopting provisions that recognize deployment of advanced technology by an industrial user as delivering a vital, substantial, niche service to the public, a service different but not lesser than the service provided on a commercial network.

The Commission has already acknowledged that utilities, one category of industrial user, may use wireless broadband spectrum for a variety of internal applications that do not always fit neatly into the FCC's delineations of system types for build-out purposes. In granting waiver relief, the Commission took into account that the utilities targeted as potential lessees of the 2.3 GHz WCS C and D Block spectrum held by AT&T, "might not fall within the traditional mobile, point-to-multipoint, or point-to-point fixed models."<sup>7</sup> It recognized that:

hybrid or non-traditional operations that do not fit precisely into one category; for example, there may be WCS point-to-multipoint systems that could be viewed as functionally consistent with a WCS point-to-point RF network, *e.g.*, certain smart grid links to monitoring stations, maintenance instrumentation, automatic metering, collection points, and video surveillance.<sup>8</sup>

The FCC concluded that "in order to ensure a satisfactory level of construction for each of its markets while accommodating AT&T's anticipated deployment, we will require AT&T to meet its population coverage obligation by establishing a significant presence in a minimum number of states within each REAG."<sup>9</sup>

A similarly flexible approach would allow industrial entities to demonstrate that they are making productive use of spectrum through measurements other than the population or geography covered by their facilities. Spectrum utilization could, and should, be evaluated based on the investment they make in their deployment and the resulting benefits, including advanced IIoT applications that they implement as a result of that investment, and the benefits thereby delivered to their customers, which typically are a significant segment of the American public.

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<sup>7</sup> *Order*, AT&T Mobility Spectrum LLC, BellSouth Mobile Data, Inc., New Cingular Wireless PCS, LLC, and SBC Telecom, Inc., Petition for Limited Waiver of Interim Performance Requirement for 2.3 GHz WCS C and D Block Licenses, WT Docket No. 16-181, DA 17-78 at ¶ 5 (2017).

<sup>8</sup> *Id.*

<sup>9</sup> *Id.* at ¶ 15.

**3) Continue the trend toward longer license terms for geographic authorizations to more closely align license terms with lease timelines needed to support investments by industrial users.**

The economic model of commercial networks is based on payments received from subscribers as rapidly as possible. By contrast, investments by industrial entities in spectrum and the facilities deployed on them are expected to be recouped over time through factors such as increased productivity, operating efficiencies, and intangibles such as superior security protection and reliability. These are long-term business objectives that require long-term investment strategies. Industrial entities typically cannot justify investing in a spectrum lease of limited duration, particularly since neither the licensee nor the FCC is able to guarantee that the underlying license will be renewed so that the lease may be extended. For example, utility assets typically are depreciated over 20- or 30-year periods, sometimes even longer.

For this reason, the IIoT Coalition supports the Commission's recent consideration of 15-year or even longer license terms.<sup>10</sup> It is significantly more likely that an industrial user will be able to justify a lease of this length rather than the 10-year or shorter leases available today. This better correlation between a lessee's investment model and the FCC's license terms will lead to greater interest in spectrum leasing options.

**4) Process leases under IAP and make other changes to the FCC forms to facilitate prompt processing with minimal administrative effort by the parties.**

The IIoT Coalition agrees with commenters that recommend processing leases and subleases under the Commission's Immediate Approval Procedures ("IAP").<sup>11</sup> Streamlining the approval process should provide an incentive to parties that might otherwise be deterred by a review period that can be lengthy and whose length cannot be determined in advance. Of course, the processing time necessarily is dependent on the number of lease applications filed and limitations on staff resources, but the uncertainty of the timing discourages greater use of the leasing option. IAP processing would resolve that issue. Since the Commission always retains the right to set aside the actions it takes within 30 days,<sup>12</sup> there is little if any risk that relying on IAP will result in lease approvals that are determined to be contrary to the public interest.

The changes proposed to the Form 608 itself by various parties would also be welcome, but such changes typically involve substantial time and investment by the FCC. Even the simplest modification of an FCC form can take what in the private sector might be considered an inordinate amount of time. Therefore, while the IIoT Coalition endorses those proposals, it urges the FCC to act on those matters that can be implemented by Commission action without involving third-party vendors.

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<sup>10</sup> See, e.g., *Review of the Commission's Rules Governing the 896-901/935-940 MHz Band*, Notice of Proposed Rulemaking, WT Docket No. 17-200, 34 FCC Rcd 1550 at ¶ 59 (2019).

<sup>11</sup> 47 C.F.R. § 1.948(j)(2).

<sup>12</sup> 47 C.F.R. § 1.108.

**5) Permit reaggregation of partitioned/disaggregated spectrum.**

A number of carriers strongly supported allowing them to reaggregate spectrum that has been partitioned and/or disaggregated.<sup>13</sup> The IIoT Coalition agrees that this is a common-sense option that should be implemented promptly. It is administratively burdensome both for the FCC and licensees to administer multiple call signs that collectively constituted a single original license. The alarms raised by some about this option being misused to “game” the system and allow licensees to evade build-out requirements appear to the IIoT Coalition to be over-blown and well within the Commission’s ability to manage.

**6) Reinstitute the spectrum dashboard so parties can identify available spectrum.**

Many members of the IIoT Coalition used the Commission’s spectrum dashboard in the past and would welcome its reconstitution and availability for public access. As more bands are made available and as this proceeding achieves its goal of promoting leasing, partitioning and disaggregation, identifying available spectrum will become an increasingly difficult task. Reviving the spectrum dashboard or a similar tool and updating it routinely for public use would further the objectives of the MOBILE NOW Act.

**Conclusion**

The existing leasing, partitioning, and disaggregation rules are important tools in promoting the more efficient use of spectrum but, as noted in the Act, more could be done. The use of these market-based transactions will be enhanced by adoption of the incentives and process improvements proposed in the NPRM and supported herein. Including private industrial entities as a category to which these rule or policy changes apply will act as an accelerant in placing spectrum into productive use and delivering the benefits of advanced IIoT applications to the American public.

Respectfully submitted,

**IIoT Coalition**

American Petroleum Institute  
Edison Electric Institute  
Enterprise Wireless Alliance  
FedEx Corporation  
General Electric Company  
National Rural Electric Cooperative Association  
Southern Communications Services, Inc.  
Union Pacific Railroad Company  
Utilities Technology Council

Attachment

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<sup>13</sup> See, e.g., Reply Comments of Sprint Corporation and Reply Comments of CTIA filed July 2, 2019.

## **The Potential for the IIoT via Licensed Spectrum Access and Private Wireless Networks**

The IIoT is delivering significant gains in industrial operations and services. Efficiency, productivity, security, safety and performance in industrial sectors such as electric power, oil and gas, manufacturing, healthcare, freight rail, and transportation will reap benefits from the IIoT. The IIoT has the potential to boost U.S. industrial sectors' economic performance. For example, Accenture<sup>1</sup> estimates that IIoT can add US \$6.1 trillion to the United States' economy by 2030 and by improving the nation's broadband networks infrastructure, which would include broadband wireless access, this figure could grow to US \$7.1 trillion.

Enabling the IIoT with dedicated, secure private wireless networks is critical to delivering on the operational benefits and economic performance for U.S. industrial sectors. Industrial companies are looking to work with technology vendors to develop new IIoT connectivity solutions that take advantage of private 4G and soon 5G networks for automating, monitoring, and managing industrial infrastructure and field assets. Access to licensed spectrum is a critical enabler for taking advantage of innovations in real-time access to digital industrial data and edge computing technologies.

Industrial operations increasingly use digital inspection and sensor technologies such as aerial drones, robots and high-resolution video cameras. Leveraging these automated inspection capabilities provides industrial and critical infrastructure operators with access to real-time monitoring and inspection data from oil refineries and wells, gas pipelines, electrical grids and substations, gas compression facilities and remote facilities that are not easily or safely accessible by human inspectors and technicians. Drones, robots, video cameras and other connected devices can perform inspections and provide access to industrial machinery and data in remote areas in a real-time, secure and safe manner.

New developments and innovation in edge computing technology will enable industrial operators to process and store vast amounts of data that is generated by industrial and critical infrastructure machinery, sensors and other remote monitoring equipment. Using edge computing technology allows industrial and critical infrastructure operators to process and analyze real-time data to boost productivity and operational efficiency, proactively reduce operations downtime, improve fault avoidance and promote safety.

Industrial and critical infrastructure operators have struggled to gain access to licensed spectrum in a cost-effective or site-specific manner. Past and upcoming spectrum auctions entailed or will entail large licensing areas, e.g., Counties, Partial Economic Areas (PEAs). With larger licensing areas, spectrum auctions have raised more than US \$20 billion based on the last three FCC auctions including the Incentive Auction, Auction 102 and 102, and are tailored to meet the needs of commercial wireless carriers with spending capacity. For their site-specific private

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<sup>1</sup> [https://www.accenture.com/acnmedia/accenture/conversion-assets/dotcom/documents/global/pdf/dualpub\\_18/accenture-industrial-internet-things-growth-game-changer.pdf](https://www.accenture.com/acnmedia/accenture/conversion-assets/dotcom/documents/global/pdf/dualpub_18/accenture-industrial-internet-things-growth-game-changer.pdf)

wireless networks, industrial and critical infrastructure operators cannot realistically bid on an entire county or PEA, let alone compete with the traditional carriers on spectrum acquisition.

Access to licensed spectrum is a critical enabler for taking advantage of innovations in real-time access to digital industrial data and edge computing technologies. Gaining affordable and timely access to licensed spectrum is critical for industrial operators to be able to deploy and operate private 4G and 5G networks to take advantage of the developments in remote inspection and access, and edge computing technologies and solutions. Private wireless networks using licensed spectrum enable industrial and critical infrastructure operators with interference-free, low-latency, high-bandwidth, controllable wireless connectivity for their mission-critical operations.

Industrial and critical infrastructure operators cannot solely rely upon traditional wireless operator networks to deliver the secure, wireless network functionality needed for their mission-critical operations. While industrial users have access to wireless spectrum in frequency bands such as 450 MHz, 600 MHz, 900 MHz, 1.4 GHz, 6 GHz and 38 GHz, they lack sufficient bandwidth and allow only limited scalability to support the growing base of industrial connected assets and IIoT digital applications. Additionally, many industrial and critical infrastructure sites are located in remote areas with inadequate indoor and outdoor wireless coverage.

Alternatively, industrial operators can secure licensed spectrum through spectrum leasing via secondary market transactions with larger licensees, which are typically the traditional wireless carriers. Though spectrum leasing transactions occur, secondary market transactions have to date had a limited impact on enabling small and innovative spectrum users with acceptable and affordable conditions to acquire spectrum. Rather, secondary market spectrum leasing transactions have successfully enabled traditional wireless carriers to expand or consolidate their spectrum holdings.

Industrial operators have faced several challenges in executing efficient and affordable spectrum leases with larger licensees for their private wireless networks and these include:

- **Unaffordability.** Electric utilities looking to connect an exponentially growing base of mission-critical, wirelessly connected field assets and infrastructure are unable to close deals with wireless carriers to affordably lease 20 to 40 MHz of licensed spectrum. High transaction costs, network buildout and service area obligations contribute to the unaffordability, which results in unused spectrum not being put to good economic and productive use.
- **Lack of Investment Certainty.** Hospitals and electric utilities seek investment certainty for their private network deployments. Having a spectrum lease for up to 15 years capitalizes on investment certainty.
- **Limited Financial Incentives for Leasing.** Without making market-based or financial incentives available (e.g., such as bidding credits for future spectrum auctions), larger licensees, such as wireless carriers are not motivated to devote corporate resources to making their excess spectrum or undeployed licensed areas available for leases to private wireless network operators.



Industrial and critical infrastructure operators' lack of efficient and affordable access to licensed spectrum through auctions or secondary markets has negatively impacted operations in many areas. Described below are three examples of how the lack of access to licensed spectrum via secondary markets is causing an impact in three industrial sectors, namely freight rail operations, energy utilities and hospitals:

- **Freight Railway.** Lack of innovation in operations precision, automation and security at major rail yards. The lack of licensed spectrum limits real-time asset tracking, engine train performance data analysis, integration of cyber security in data transmission, and use of technologies to remotely monitor rail operations to better ensure safety and derailment.
- **Energy Utilities.** Without access to licensed spectrum with greater amounts of bandwidth, utilities must rely on Wi-Fi, spectrum with lower channel bandwidths or the carriers' public wireless networks. These options do not consistently provide interference protections, 24x7x365 availability and reliability, scalability and quality of service. The lack of higher bandwidth licensed spectrum limits opportunities for utilities. It delays their ability to deploy new IIoT devices and networks to improve the safety, security and productivity of utility distribution networks.
- **Hospitals.** Medical care facilities typically use WiFi and WMTS (Wireless Medical Telemetry Service) for private network data connectivity. The inability to affordably lease and deploy licensed spectrum limits hospitals from integrating new IIoT devices and applications with private 4G and 5G networks to deliver quality patient care and services including: real-time patient and vital signs monitoring, robust low-latency connectivity for triggering drug administration, and enabling greater clinical equipment mobility to provide timely care for mobile and remote patients.

It is imperative that any rule changes to facilitate secondary market transactions for spectrum partitioning, disaggregation and leasing apply to common carriers and non-carriers, including industrial and critical infrastructure operators. This provision not only creates a viable roadmap for industrial and critical infrastructure operators to more affordably procure and deploy site-specific private wireless networks using licensed spectrum, but also to incorporate the IIoT in their operations and position the U.S. industrial sector as a global leader in leveraging 5G for digital industrial technologies.

The Commission's rule changes on spectrum partitioning, disaggregation and leasing can change the economic equation for industrial and critical-infrastructure entities in being able to deploy private wireless network to implement new, innovative, data-intensive IIoT wireless operations. Described below are several examples from the freight rail, power utility, oil and gas, and air cargo transportation sectors of IIoT use cases that can be enabled via licensed spectrum on private wireless networks:

**Freight Rail IIoT Use Cases:**

- Autonomous trains enabled with low-latency, real-time remote control.
- Automated, remote real-time track inspections to prevent derailments.
- Real time asset tracking and security monitoring using imaging, biometrics.
- HAZMAT sensors connectivity and monitoring.
- Cyber security on railway digital data transfers and assets.

**Power Generation and Utility IIoT Use Cases:**

- Augmented/virtual reality for field-based utility staff training and safety.
- Clean power (solar, wind, etc.) performance and safety monitoring via secure, low-latency connectivity.
- High-speed SCADA systems connectivity for electrical grid and field distribution network management.
- Remote video surveillance at gas pipeline transfer stations.

**Oil and Gas IIoT Use Cases:**

- Proactive maintenance using remote HD-video cameras with image processing of flare stacks and production machinery.
- IoT sensor monitoring to optimize pumping activities, ensure health of pipelines and wells, prevent equipment failures and gas leaks, and track pipe thickness, temperature and erosion.

**Air Cargo Transportation Use Cases:**

- Autonomous aircraft tugs to ensure greater personnel safety and field operations efficiency.
- Real-time asset tracking to improve airport operations, security and safety
- 2-way video, A/R and V/R for aircraft maintenance and repair personnel training and troubleshooting.
- Automated, high-speed avionics and flight instrumentation data transfer to proactively identify aircraft and engine mechanical and systems failures and prevent accidents and unscheduled aircraft downtime.